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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,357	03/31/2004	James Wilson Rose	140167	8296
6147 7590 09/26/2007 GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			EXAMINER LEE, SHUN K	
			ART UNIT 2884	PAPER NUMBER
			MAIL DATE 09/26/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/815,357	Applicant(s) ROSE ET AL.	
	Examiner Shun Lee	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-13, 15, 16 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9, 12, 13, 15, 16 and 18-25 is/are rejected.
- 7) ☒ Claim(s) 10 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 17 July 2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 12, 13, 15, 16, 18-21, and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Karellas (US 5,465,284).

In regard to claim 1, Karellas discloses (Figs. 1-6) a radiation imaging system such as a computer tomography (CT) system for generating an image of an object (subject 16), the imaging system comprising:

(a) an X-ray source (X-ray tube 12 or radio-nuclide source 40) disposed in a spatial relationship to the object (16) configured to transmit X-ray radiation (X-rays 14) through the object (16);

- (b) at least one X-ray detecting media (scintillation screen 20 or scintillating fiber optic plate 48) configured to convert the X-ray radiation (14) transmitted through the object (16) to optical signals (column 3, lines 57-59);
 - (c) a modulator (*i.e.*, " ... image intensifier can be optically bonded ... between the fiberoptic converter and fiberoptic taper ... "; column 8, lines 46-52) configured for modulating the optical signals;
 - (d) an optical transmission conduit (bellows 26 or fiber optic 44) comprising a first end and a second end; and
 - (e) an optical detector (CCD 24) comprising a plurality of photosensitive devices and configured to convert each of the optical signals to a corresponding electrical signal (column 4, lines 1-5); and
- wherein the first end of the optical transmission conduit (26, 44) is coupled to the at least one X-ray detecting media (20, 48) via the modulator (column 8, lines 46-52) and the second end is coupled to the optical detector (24).

In regard to claim 2 which is dependent on claim 1, Karellas also discloses (Figs. 1-6) an image processor (memory 32 and data processor 34) coupled to the optical detector (24) and configured for processing the electrical signals to generate the image.

In regard to claim 3 which is dependent on claim 2, Karellas also discloses (Figs. 1-6) that the X-ray detecting media (20, 48) comprises a plurality of scintillators.

In regard to claim 4 which is dependent on claim 3, Karellas also discloses (Figs. 1-6) that the optical transmission conduit (26, 44) comprises a plurality of guided optics.

In regard to claim **5** which is dependent on claim 4, Karellas also discloses (Figs. 1-6) that each one of said plurality of guided optics (26, 44) is coupled to a corresponding one of the plurality of scintillators (20, 48).

In regard to claim **12** which is dependent on claim 1, Karellas also discloses (Figs. 1-6) an optical coupling mechanism (e.g., lens 22 and/or mirror 52) configured to enhance a coupling efficiency and for directing the optical signals through the optical transmission conduit.

In regard to claim **13**, Karellas discloses (Figs. 1-6) a method for generating an image of an object (subject 16), the method comprising:

- (a) transmitting X-ray radiation (X-rays 14) through the object (16) at a predetermined location;
- (b) converting (with a scintillation screen 20 or a scintillating fiber optic plate 48; column 3, lines 57-59) the X-ray radiation (14) transmitted through the object (16) to optical signals;
- (c) modulating (*i.e.*, with an " ... image intensifier ... "; column 8, lines 46-52) the optical signals;
- (d) providing an optical transmission path (bellows 26 or fiber optic 44) for modulated optical signals to an optical detector (CCD 24), wherein the optical detector (24) comprises a plurality of photosensitive devices (column 4, lines 1-5);
- (e) converting (with the CCD 24; column 4, lines 1-5) each of the modulated optical signals to a corresponding electrical signal; and

(f) processing (with memory 32 and data processor 34) the electrical signals to generate the image.

In regard to claim **15** which is dependent on claim 14, Karellas also discloses (Figs. 1-6) that the step of providing the optical transmission path (26, 44) comprises using a plurality of optical fibers and optical waveguides.

In regard to claim **16** which is dependent on claim 14, Karellas also discloses (Figs. 1-6) that the optical transmission path comprises a plurality of free-space optics (e.g., lens 22 and/or mirror 52).

In regard to claim **18** which is dependent on claim 13, Karellas also discloses (Figs. 1-6) directing (e.g., with lens 22 and/or mirror 52) the optical signals through the optical transmission path.

In regard to claim **19**, Karellas is applied as in claim 1 above.

In regard to claim **20** which is dependent on claim 19, Karellas also discloses (Figs. 1-6) that the X-ray source (12, 40) and the at least one X-ray detecting media (20, 48) are disposed on a gantry assembly (*i.e.*, a means to rotate the source and detector assembly relative to the object; column 16, lines 38-44) of the CT system, wherein the gantry assembly is configured to rotate about the object (16) being imaged.

In regard to and claim **21** which is dependent on claim 20, Karellas also discloses (Figs. 1-6) an optical coupling mechanism (e.g., with lens 22 and/or mirror 52) configured to couple the optical signals generated by the X-ray detecting media (20, 48) disposed on the gantry assembly to the optical detector (24).

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In regard to claim **23** which is dependent on claim 19, Karellas is applied as in claim 2 above.

In regard to claim **24** which is dependent on claim 19, Karellas is applied as in claim 4 above.

In regard to claim **25** which is dependent on claim 19, Karellas is applied as in claim 16 above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karellas (US 5,465,284) in view of Gross *et al.* (US 6,310,352).

In regard to claims **7-9**, the system of Karellas lacks that the modulator comprises an optical amplifier configured to operate in a continuous wave mode or pulse-sampling to change an amplification factor of the optical signals. However, Karellas also discloses (column 8, lines 46-52) that the image intensifier can be a proximity diode type or a microchannel plate device, both commercially available. Since Karellas does not disclose and/or require a specific modulator (e.g., the modulator can be a microchannel plate), one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified modulator of Karellas as any one of the known conventional modulators that would not require further description. Further, Gross *et al.* teach (column 2, lines 19-32) to substitute optical amplifiers as an alternative to microchannel plates and (column 3, lines 10-56) wherein the optical amplifiers amplify scintillation light for transmission of the modulated optical signal (*i.e.*, the amplified scintillation light) over distances typically encounter within imaging devices and detectors (column 1, line 3 to column 2, line 18). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional modulator (e.g., an optical amplifier pumped by either a CW or pulsed laser, in order to amplify the optical signal for transmission to a optical detector) as the unspecified modulator in the system of Karellas.

7. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Karellas (US 5,465,284) in view of Pandelisev (US 2002/0117625).

In regard to claim **22** which is dependent on claim 21, the system of Karellas lacks that the optical coupling mechanism comprises a micro-lens array. However,

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since Karellas does not disclose and/or require a specific lens, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified lens of Karellas as any one of the known conventional lenses that would not require further description. Further, Pandelisev teaches (paragraphs 4 and 5) that microlenses may be used to direct the emission from scintillators to detectors. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional lens (e.g., a micro-lens array to direct the emission from scintillators to detectors) as the unspecified lens in the system of Karellas.

Allowable Subject Matter

8. Claims **10** and **11** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to a nonobvious improvement over the invention patented in US Patent 5,465,284. The improvement comprises in combination with other recited elements, that the modulator comprises an optically addressed spatial light modulator.

Response to Arguments

10. Applicant's arguments filed 17 July 2007 have been fully considered but they are not persuasive.

Applicant argues (last two paragraphs on pg. 9 to second paragraph on pg. 10 of remarks filed 17 July 2007) that nowhere does Karellas describe a need to amplify the

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signals from the scintillation screen since the signals are directly coupled to the CCD via lens 22 (column 3, lines 55-67). Examiner respectfully disagrees. Karellas states (column 8, lines 46-52) that if " ... higher signal amplification is required for some high detail low dose applications, ... image intensifier can be optically bonded ... between the fiberoptic converter and fiberoptic taper ... ". Thus Karellas expressly teach to use a modulator (*i.e.*, "image intensifier") to amplify the signals from the scintillation screen (*i.e.*, "the fiberoptic converter").

Applicant also argues (last two paragraphs on pg. 9 to second paragraph on pg. 10 of remarks filed 17 July 2007) that Karellas does not disclose the need to transmit the signals over large distances. Examiner respectfully disagrees. First it should be noted that both Karellas and Gross *et al.* are directed to detectors and devices such as an Anger camera (*e.g.*, see column 13, lines 23-25 of Karellas and column 1, lines 3-20 of Gross *et al.*). Within the context of the disclosure of Gross *et al.*, a "long distance" is the distances within an apparatus that scintillation light is required to travel an optical detector. Further, Karellas discloses embodiments wherein the scintillator is not in contact with the optical detector (*e.g.*, see Fig. 1). Karellas does disclose the need to transmit the signals over distance (or the "long distance" as used within the disclosure of Gross *et al.*).

Applicant argues (third and fourth paragraphs on pg. 10 to second paragraph on pg. 11 of remarks filed 17 July 2007) that Gross *et al.* do not disclose a modulator for first modulating the optical signals and then transmitting the modulated optical signals using an optical conduit. In response to applicant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the

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structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Gross *et al.* teach (column 2, lines 19-32) to substitute optical amplifiers as an alternative to microchannel plates and (column 3, lines 10-56) wherein the optical amplifiers amplify scintillation light for transmission of the modulated optical signal (*i.e.*, the amplified scintillation light) over distances (*i.e.*, "long distance") typically encounter within imaging devices and detectors (column 1, line 3 to column 2, line 18).

In response to applicant's argument (fifth paragraph on pg. 10 of remarks filed 17 July 2007) that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is some teaching, suggestion, or motivation to do so found in the references themselves. Karellas discloses (column 8, lines 46-52) that the image intensifier can be a proximity diode type or a microchannel plate device, both commercially available. Since Karellas does not disclose and/or require a specific modulator (*e.g.*, the modulator can be a microchannel plate), one having ordinary skill in the art at the time of the invention would reasonably interpret the

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unspecified modulator of Karellas as any one of the known conventional modulators that would not require further description. Further, Gross *et al.* teach (column 2, lines 19-32) to substitute optical amplifiers as an alternative to microchannel plates and (column 3, lines 10-56) wherein the optical amplifiers amplify scintillation light for transmission of the modulated optical signal (*i.e.*, the amplified scintillation light) over distances typically encountered within imaging devices and detectors (column 1, line 3 to column 2, line 18). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional modulator (*e.g.*, an optical amplifier pumped by either a CW or pulsed laser, in order to amplify the optical signal for transmission to a optical detector) as the unspecified modulator in the system of Karellas.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SL


CONSTANTINE HANNAHER
PRIMARY EXAMINER